

IMPROVED METHOD AND MATERIALS
FOR SURFACE PROTECTION

5

by

Brad Caroline

and

Craig Puderbach

CROSS-REFERENCES TO RELATED APPLICATIONS

10

This application is a continuation-in-part of the inventors' pending United States non-provisional application, Serial Number 10/603,882, filed June 25, 2003, which is a continuation-in-part of the inventors' previously filed United States non-provisional application, Serial Number 09/747,222 which was published on June 27, 2002 as US 2002/0081383 A1, and which issued as U.S. Patent Number 6,623,805 B2 on September 23, 2003.

15

STATEMENT REGARDING FEDERALLY SPONSORED
RESEARCH OR DEVELOPMENT

20

None.

REFERENCE TO MICROFICHE APPENDIX

None.

BACKGROUND OF THE INVENTION

25

Field of the Invention

The invention relates to sealing products and improved methods of application to provide an impenetrable and either permanent or quickly and easily removable durable, protective coating for a variety of surfaces or uses.

Description of the Related Art Including
Information Disclosed under 37 C.F.R. 1.97 and 1.98

A search of the prior art located the following United States patents which are believed to be representative of the present state of the prior art: U.S. Patent No. 5,851,618, issued December 1998; U.S. Patent No. 5,193,716, issued March 1993; U.S. Patent No. 3,657,001, issued December 1972; U.S. Patent No. 5,372,637, issued December 1994; U.S. Patent No. 3,846,355, issued November 1974; U.S. Patent No. 4,396,681, issued August 1983; U.S. Patent No. 4,511,626, issued April 1985; U.S. Patent No. 4,461,788, issued July 1984; and G.B. Patent No. 1 306 020, issued February 1973. These references, however, suffer from one or more of the following disadvantages, as more specifically detailed below.

BRIEF SUMMARY OF THE INVENTION

Numerous masking or coating compounds or methods are known in the field of art to seal or otherwise protect surfaces or finishes from undesired contact with processing or construction unrelated to the surfaces or finishes. These known compounds or methods, however, do not adequately protect against penetration by foreign objects contacting or otherwise resting on the sealed surface and which become further forced into the surface by foot-traffic, accidental dropping, or similar external forces related to construction or repair activities taking place proximately to the sealed surface area. The sealed surfaces presented in the prior art are most suitable to temporarily protect against paint overspray, sun damage, weather damage, or similar non-impact

invasion. These prior art surfaces, however, lack durability and require time consuming, separate applications and drying times for any associated release agents plus the protective surface for removable applications. The prior art application methods do not use individually portable application means, thus limiting their range and suitability for applications in close quarters.

Also, the prior art require release agents or first barrier coats to be dried before applying the protective coating (see U.S. Patent 5,851,618, column 3, lines 53 - 59). The prior art is similarly limited to protecting horizontal floor or similarly flat topographies (see, e.g., U.S. Patent 5,851,618, column 3, lines 23 - 25).

None of the prior art is durable enough for repeated use on identical protective surface topographies.

Some of the prior art teach the use of latex based materials which do not provide suitable protective coatings for the applications using the materials or methods of the present invention.

Therefore, it is an object of the present invention to provide an economical, durable multi-purpose surface coating.

It is another object of the present invention to provide such a surface coating which is also quickly and easily applied to any surface in one application.

Another object of the present invention to provide such a surface coating which is also quickly and easily applied to any surface without requiring drying of any pre-coat or release agent

coating.

It is another object of the present invention to provide such a surface coating which can be quickly and easily removed once the activity upon or around the surface, and which activity
5 is being guarded against, has ceased.

It is yet another object of the present invention to provide such a surface coating which can be permanently applied, depending upon the application, to guard against weather, water, sun damage, wind damage, or to provide specific desired benefits
10 such as improved traction for wet surfaces.

Another object of the present invention is to provide a method to allow for portable self-contained applications of such surfaces using apparatus known in the art.

Yet another object of the present invention is to provide
15 such a surface coating which is impenetrable from most activities which would otherwise scrape, chip, gouge, crack, scar, dent, or discolor an unprotected surface.

Yet another object of the present invention is to provide such a surface coating applicable to unfinished or finished
20 surfaces including, but not limited to, porcelain, concrete, metal, stone, tile, glass, plastic, wood, or composite materials, regardless of the vertical or horizontal orientation of the finished surfaces.

Yet another object of the present invention is to provide
25 such a surface coating in order to avoid scratching, nicking, marring, chipping, staining, painting, and abrading unfinished or

finished surfaces including, but not limited to, porcelain, concrete, metal, stone, tile, glass, plastic, wood, composite materials, and the like.

It is a further object of the present invention to provide an improved spray on surface coating application which is durable enough to be reused on surfaces presenting identical surface geometries.

These together with other objects of the invention, along with the various features of novelty which characterize the invention, are described with particularity in the claims attached to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be made to the descriptive materials in which there are described various preferred embodiments of the invention. Other features, advantages, and objects of the present invention will become apparent with reference to the following description.

BRIEF DESCRIPTION OF DRAWINGS

There are no drawings of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The detailed description, as set forth below, is intended as a description of the composition and method of the preferred embodiment of the invention, and is not intended to represent the only form in which the present invention may be practiced, constructed or operated. It is to be understood that the invention may be practiced by other different embodiments, which

are also encompassed within the spirit and scope of the invention.

The preferred embodiment of this invention provides a method for protecting bath tubs, whirlpools, shower stalls, shower pans, tile, marble, glass, metal, and similar smooth, non-porous surfaces, and the like, during construction work surrounding such surfaces, or for similar protective purposes. This embodiment provides a protective surface coating composition and portable method which can be quickly and easily applied and removed once construction or other activity upon or around the surface, selected to be guarded, has ceased. The removed protective surface coating of the present invention's novel method and materials can be reused for several applications with identical surface geometries. Another embodiment further provides a protective surface coating that is both durable and applied in a portable single spray application after the surface has been treated with a primary sprayed release agent for removable coating applications. Because of the method of application, this novel finished surface protection is equally quickly and easily applied within a few minutes to, as well as quickly and easily removed within seconds from, vertical and horizontal surface topographies.

It has been found through testing and experimentation that for general purposes the preferred coating formulation for the present invention is a 49% - 52% mixture by weight or volume of a pre-polymer mixture to correlative percentage of a curative

mixture, resulting in a mixture of within 3% equal parts by volume or weight of the two ingredients. The present invention can be practiced with up to a three to one ratio of pre-polymer mixture to correlative percentage of a curative mixture by weight or volume. For the preferred embodiment, this mixing of ingredients is accomplished at the disposable spray nozzle of a portable spray applicator. Such spray applicators are known in the art and provide separate product reservoirs which feed through separate, heated flow lines to the spray nozzle. The heated flow lines allow for the optimal application temperature of the coating material in the temperature range from 20 degrees Fahrenheit to 120 degrees Fahrenheit. This preferred embodiment of the present invention is provided by using a composition of a prepolymer polyurethane from the isocyanate terminated prepolymer family and a curative polyurethane from the hydroxyl terminated polyether polyol chemical family. The preferred embodiment of the present invention uses a blended silicone solution as a releasing agent. These preferred embodiment release agent ingredients provide optimal results when applied to surfaces between ambient temperatures of 20 degrees Fahrenheit and 120 degrees Fahrenheit.

It is a critical feature of the preferred embodiment of the present invention that the application means for the protective coating comprises an adjustable dual pump sprayer further comprising a disposable spray nozzle tip wherein the pre-polymer mixture and the curative mixture are mixed at the disposable

spray nozzle tip and atomized by compression to provide a four to five inch spray pattern.

5 All embodiments of the protective coating of the present invention can be applied using either low pressure, portable spraying systems mounted on manually supported or positioned frames, such as handcarts, backpacks, and the like, or with high pressure spraying systems mounted in a motor vehicle, such as a mini van, and the like. The release agent is applied using a HVLP quart spray gun, or the like, for fine spray atomization of
10 the release agent and even coverage thereof over the protective surface.

The prepolymer polyurethane of the preferred embodiment of the present invention includes a mixture of: from 35% to 75% polymeric diphenylmethane diisocyanate, preferably 70%; from 7%
15 to 35% 4,4-diphenylmethane diisocyanate, preferably 25%; and from 1% to 8% trischloropropyl phosphate, preferably 5%.

The curative polyurethane of the preferred embodiment of the present invention includes a mixture of: from 2% to 76% hydroxyl terminated poly (oxyalkylene) polyethers, preferably 74%; from 1%
20 to 17.5% butanediol, preferably 17%; from 1% to 9% diethyltoluenediamine, preferably 8.1%; and from 0.5% to 1% of organotin catalyst, preferably 0.9%.

One possible releasing agent of the preferred embodiment of the present invention includes a mixture of: from 0.5% to 2% Stoddard solvent, preferably 1.5%; 90% aliphatic hydrocarbon; and
25 from 1 % to 10% silicone blend, preferably 8.5%. An alternate

releasing agent for the preferred embodiment of the present invention includes 90% aliphatic hydrocarbon and 10% silicone blend.

Another embodiment of the present invention uses a composition of a prepolymer polyurethane from the isocyanate chemical family which includes a mixture of: from 0.5% to 1% of toluene diisocyanate, preferably 0.5%; from 20% to 67% isocyanate terminated prepolymer, preferably 45%; from 4% to 10% diphenylmethane diisocyanate, preferably 7%; from 2% to 4.5% higher oligomers of MDI, preferably 2%; from 1% to 13% parafinic and naphthenic petroleum blend, preferably 5%; from 16% to 58% chlorinated hydrocarbon, preferably 38%; and from 2% to 3% hydrophobic silica, preferably 2.5%. This embodiment of the present invention uses a composition of a curative polyurethane which includes a mixture of: from 0.2% to 0.6% of an organomercury catalyst, preferably 0.5%; from 10% to 17% petroleum hydrocarbon, preferably 15%; from 38% to 45% polyether polyols, preferably 43%; from 26% to 37% calcined kaolin, preferably 35%; and from 8% to 12% hydrophobic silica, preferably 6.5%.

The coating materials of either embodiment of the present invention are applied by a portable spray method which takes advantage of the near equal parts pre-polymer to curative ratios and the point of application mixing afforded by the spray application. The preferred method includes inspection of the surface to be coated to insure that the surface is free from

dust, dirt, abrasive materials, oil, moisture, and any other condition that would interfere with the application process. Thereafter, the boundaries of the surface to be coated are masked with a suitable material, such as masking tape. Preformed, thin sheet metal aprons are useful in guarding the adjacent surface areas from coating overspray, if necessary. Any standard sized functional opening in the application surface for temporary coatings is likewise protected by applying convex polyvinyl molds or vinyl tape over such opening prior to the application of coating materials. Non-standard sized functional openings are protected using polyvinyl film or vinyl tape known in the art. When the ambient temperature is between the optimal range for the coating materials to be used, a releasing agent is applied to the surface to be coated for temporary applications.

Permanent coating applications do not require application of a releasing agent. Prepackaged equal amounts of the coating materials selected for use are loaded into the portable spray applicator which is fitted with a disposable mixing spray nozzle. The selected coating materials are then heated to a range of 40 degrees Fahrenheit to 120 degrees Fahrenheit. Once the coating materials reach this preheated temperature, they are applied to the surface to be coated by use of the portable spray applicator. For temporary coating applications, the vertical surface coating thickness is typically from 1/32 to 1/16 of an inch. For temporary coating applications, the horizontal surface coating surface is typically from 1/16 to 3/32 of an inch. For permanent

coating applications, the application coating thickness is adjusted to suit each particular permanent application.

After the initial application of heated coating materials have been applied, the applied protective material coating can be adjusted by reapplying the protective material as necessary. The coated surface is allowed to cure, a period which takes between 30 to 45 seconds for the preferred embodiment. Other embodiments of the present invention provide cure time ranges between 10 minutes and 15 minutes, depending upon the ambient temperature, relative ratios of pre-polymer and curative, and atmospheric pressure. Once the protective coating has cured, the desired activities to be performed upon or around the protective coating and the protected surface can commence and be completed. If the protective coating is temporary, the protective coating and masking materials are quickly and easily removed upon completion of the desired activities by lifting a side loose from the protected surface and pulling the cured, protective coating away from the surface by hand. In this manner, the protective coating can be removed from standard bath tubs, shower stalls, shower pans, and the like, within seconds of separating a coating side from the protected surface. Similarly, the convex molded coatings and the underlying convex polyvinyl molds over any functional openings can be easily located and cut open or pulled off by tradesmen needing to access the opening for repairs, testing, connections, and the like, while the protective coating covers the protectively coated surface.

A critical advantage of the temporary protective coating of the preferred embodiment over the art is the durability of the removed surface coating of the present invention which can be reused repeatedly for several applications with identical surface geometries. This heightened durability feature of the present invention over the art makes it suitable for high volume, repetitive protective coating applications such as standard bathroom fixtures, bath tubs, shower stalls, shower pans, and the like, within the same dwelling or an array of dwellings with identical standards for these fixtures.

Another important advantage of the present invention over the art is the ability to quickly and easily apply the protective coating layer to the a wet releasing agent layer. The application temperature range for the releasing agent of the preferred embodiment of the present invention is 20 degrees to 120 degrees Fahrenheit. The preferred formulation of releasing agent leaves a slippery film on the substrate in even the highest ambient temperature range from 100 degrees to 120 degrees Fahrenheit. The preferred embodiment of the releasing agent of the present invention does not dry. This feature greatly lessens the time required to prepare and treat multiple surfaces of similar or identical geometries and/or topographies. For example, application times for standard bathroom fixtures, such as bath tubs, shower stalls, sinks, shower pans, and the like, can be as low as three to four minutes.

The method and materials of the present invention are

demonstrably superior to sprayed latex based agents for the quick application to, and ease of removal from, protected surfaces.

Sprayed latex agents require longer drying times and are not suitable for top-out water testing for bath tubs, shower stalls, shower pans, and the like, since under such environments latex floats to the water's surface re-exposing the previously protected surface to the hazards of the construction work site. The materials of the present invention stay in place while such water-testing is performed.

An additional step to provide a gripping surface for the protective layer is achieved by broadcasting regular sand granules, or the like, by hand across the protective layer surface just after it has been applied. In this fashion, the sand becomes part of the top of the hardened protective layer once it dries, affording traction to the protective layer top surface. Because of the durable nature of the protective layer of the present invention, this additional step of providing means for traction on the protective layer surface does not alter the effectiveness of the protective layer in guarding the protected surface from any intrusive damage resulting from work activity directly on the protective layer.

With respect to the above description then, it is to be realized that the optimum compositional relationships and methods for the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly, manufacture, and use, are deemed readily apparent and obvious to

one skilled in the art, and all equivalent relationships to described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only
5 of the principles of the invention. Additionally, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact composition and methods described, and further, all suitable modifications and equivalents may be resorted to, falling within
10 the scope of the invention.